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**Real-time Processing of XPCS Data on a Field-programmable Gate Array**

**Timothy Madden<sup>1</sup>, John Weizeorick<sup>1</sup>, Alec Sandy<sup>2</sup>, Suresh Narayanan<sup>2</sup>, Brian Tieman<sup>3</sup>, Marcin Sikorski<sup>2</sup>, and Xuesong Jaio<sup>3</sup>**

<sup>1</sup>Optics and Detectors Group, Advanced Photon Source, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439

<sup>2</sup>Time Resolved Research Group, Advanced Photon Source, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439

<sup>3</sup>Beamline Controls and Data Acquisition Group, Advanced Photon Source, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL 60439

In x-ray photon correlation spectroscopy (XPCS) experiments at the APS, a high-speed area detector is used to capture x-ray data at 100's of frames per second and data rates of up to 125MB/sec. Because of this, large-data-rate camera calibration data cannot be applied to raw images, disk drives cannot keep up to store the data, and extremely large and unmanageable datasets are generated. To mitigate these problems, a field programmable gate array (FPGA), a type of digital integrated circuit, was developed at the APS to perform image processing in real time. The FPGA, residing on a commercial frame grabber, performs real-time image processing before the data enters the computer. In this way, the computer's internal busses are not bogged down, disk drives can keep up with the camera, and manageable data sets are saved. The FPGA, performing image averaging, noise measurements, dark subtraction and compression in real time, is controlled by an EPICS interface, and allows the fast camera to collect XPCS data continually.

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